<u>REMARKS</u>

Claims 1-50 are pending in the present application.

In the office action mailed June 15, 2005 (the "Office Action"), claims 2, 9, 21, 25, 32, and 44 were objected to based on informalities. Claims 1-23 were also rejected by the Examiner under 35 U.S.C. 101. The Examiner also rejected claims 1-13, 18-36, and 41-50 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,578,005 to Lesaint *et al.* (the "Lesaint patent"), in view of U.S. Patent Application Publication No. 20010049619 to Powell *et al.* (the "Powell reference"). Claims 14-17 and 37-40 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Lesaint patent, in view of the Powell reference, and in further view of U.S. Patent No. 5,615,121 to Babayev (the "Babayev patent").

With respect to the objection to claims 2, 9, 21, 25, 32, and 44, the claims have been amended to remove reference to "OSS" and "FSR," as suggested by the Examiner. The Examiner's objections to these claims should now be withdrawn.

With respect to the rejection of claims 1-23 under 35 U.S.C. 101, claims 1, 6, and 13, have been amended to overcome the rejection. Claims 1, 6, and 13 have been amended to expressly recite that the methods for scheduling are "computer implemented," and that the steps are performed by a computer, thus, placing the claims within the technological arts. The rejection of claims 1-23 under 35 U.S.C. 101 should now be withdrawn.

As previously mentioned, claims 1-13, 18-36, and 41-50 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Lesaint patent, in view of the Powell reference. Claims 1, 6, 13, 24, 29, 36, and 47 are patentable over the Lesaint patent in view of the Powell reference because the combined teachings of the Lesaint patent and the Powell reference do not teach or suggest the combination of limitations recited by the respective claims.

The Lesaint patent discloses a computer scheduling system for optimizing the allocation of a plurality of resources to a plurality of tasks in an environment where the availability of resources, and the tasks to be performed changes dynamically. The computer scheduling system executes a computer program having two main elements: an off-line tour construction programmed system illustrated generally in Figure 3 and an on-line real-time schedule modification system illustrated generally in Figure 4. *See* col. 9, lines 58-61. These two systems run independently, but the output of the off-line system is used as the starting point

for the operation of the on-line (real-time) system. Typically, both systems would be running at once, with the real-time system 40 controlling the current allocation of technicians to tasks while the schedule generation system 30, 31 prepares the data for the next run of the real-time system 40. *See* col. 9, line 61-col. 10, line 3.

Figure 3 of the Lesaint patent illustrates the general arrangement of the off-line system for generating the initial optimized schedule. The schedule generation system includes a deterministic pre-scheduler 30 and an optimizing subsystem 31. The system is operated using stable data, in order to prepare an initial provisional schedule which the real-time system 40 can then use as a basis for its own functioning as the situation develops. The initial optimized schedule can be prepared using a rigorous, but comparatively slow, process, because it does not have to react to changes in its data. For example, the initial optimized schedule may be prepared overnight, ready for the start of the working day. *See* col. 10, lines 4-13.

The function of the pre-scheduler 30 is to build up the fixed points in each technician's schedule, by scheduling as many as possible of the tasks it is given to satisfy the constraints it is given from a rule store 35. This will result in a "tour" of tasks for each technician. These tours are likely to be partial tours, that is, tours with some idle time, since the tasks scheduled by the pre-scheduler 30 are only a subset of all the tasks available. In addition the pre-scheduler 30 positions the "next available" time (normally the time that the technician is due to come on duty) breaks, scheduled absences, and the "end of day" event (the time that the technician is scheduled to go off duty) in each technician's tour. *See* col. 10, lines 26-37. The optimizing subsystem 31 generates a provisional schedule of allocations, by initially positioning further tasks around and between the fixed events (including the difficult-to-schedule tasks) established by the pre-scheduler 30, and then using a stochastic process to re-allocate these further tasks between the different technicians until an optimum schedule is achieved. See col. 10, lines 51-57.

The provisional schedule produced by the schedule generation system is then used to program the real-time modifier 40 illustrated in Figure 4, which is programmed to allocate tasks to technicians according to the provisional schedule, but is capable of departing from the provisional schedule if the real-time circumstances, as distinct from those predicted in the provisional schedule, require it. *See* col. 11, lines 3-9.

Figure 4 illustrates the principal features of the real-time modifier 40. A schedule status register 42, technician status register 43 and pool of work register 44 each provide an input to, and are in turn updatable by, an allocation processor 47. The registers 42, 43, 44 receive their initial data from the schedule store 32 and the pre-processors 33, 34 respectively. A parameter input 41 allows an operator to set various weightings and other values used by the system. *See* col. 11, lines 10-18. The modifier 40 is managed in such a way that changes which have come about since the schedules were generated can be taken into account at the earliest or most opportune moment. Such changes may be caused by technicians reporting in for new tasks earlier or later than expected, absences requested at short notice, changes to a scheduled task (e.g., an amended appointment), new tasks entering the system, or changes to the scheduling and allocation rules, such as a change to travel times to account for adverse weather or traffic conditions). The objective is to make sure that when a technician requests a task, the task actually allocated is the most suitable task available for that technician at the time the request for work is dealt with, whether or not it is the one originally scheduled. *See* col. 25, lines 21-33.

The Powell reference teaches a computer scheduling system that can be used to provide customers specific appointment time windows within which a service technician will arrive at the customer's residence on the specified day. The system described in the Powell reference utilizes a database of prior service requests to create a statistical estimate of a daily schedule. The process is illustrated by the flowchart in Figure 4. In summary, when a customer places an order at a service center, various time windows are suggested by the service provider and the customer selects one of the time windows. *See* paragraph 45. After the particular time window is selected, the actual service order and the selected time window are compared to the statistically estimated service orders and respective time windows. *See* paragraph 46. The estimated service order most similar to the actual service order in the selected time window is used to replace the actual service order to create a new set of service orders.

The schedule is then recomputed using the new set of service orders to create a revised daily schedule. *See* paragraph 47. By using the statistically estimated service orders in creating a revised daily schedule, time windows can be calculated based on a quasi-optimal transit time for service technicians while considering the geographical distribution and time windows that have been already promised to other customers. Narrower time windows become

possible because the service provider has confidence that it will be able to produce an acceptable schedule that will honor prior commitments. Since the service provider has increased confidence that it can honor time windows, customer service will be improved. *See* paragraph 49.

The combined teachings of the Lesaint patent and the Powell reference fail to teach or suggest the combination of limitations recited by claim 1 as amended. For example, the combined teachings does not teach or suggest a computer implemented method for scheduling splittable work orders to provide customers with requested service that includes, in pertinent part, forming a list of appointment windows for days on which service may be performed, including dividing a service area into a number of work areas, assigning a field service representative to each work area where each field service representative has an associated skill level, and assigning at least one skill level to each work area.

The Examiner argues that the Powell reference teaches these limitations. *See* the Office Action, page 5. More specifically, the Examiner cites paragraph 41 of the Powell reference, arguing that assigning bands of concentric circles around a central depot is analogous to dividing a service area into a number of areas, that "service technicians must be capable of same skills within concentric bands" is analogous to assigning a field service representative to each are where each field service representative has an associated skill level, and that assuming that the skill levels of all technicians are equal is analogous to assigning at least one skill level to each area. *See id.* The Examiner has not accurately characterized the subject matter cited in the Powell reference.

Paragraph 41 of the Powell reference describes Figure 2, which illustrates a prior art solution to refining the estimated time window of arrival. The solution is criticized in the Powell reference as failing to consider various key aspects of a scheduling problem. *See* paragraph 41. The concentric circles centered around a central depot shown in Figure 2 represent bands of "time windows" that can be used for providing estimated time windows to a customer requesting service. Each band can be assigned a range of time. For example, assuming that a work day begins at 8:00 a.m., the closest band to the central depot can represent time windows of 8:00-10:00 a.m. The next closest band can represent time windows of 9:00-11:00 a.m., and the next band representing time windows of 10:00 a.m.-12:00 p.m. This particular example is used in the Powell reference to describe Figure 2. Based on the location of the

customer, the corresponding time window can be provided to the customer as an estimate when a service representative may arrive. For example, where the customer is at location 28 in the first band (shown in Figure 2 below the central depot 22), the time window of 8:00-10:00 a.m. can be given to the customer when the appointment is scheduled. As discussed in the Powell reference, the conventional approach described with respect to Figure 2 assumes that (1) all service technicians leave from and return to the central depot 22, and (2) the service technicians are assumed to all be capable of the same skills. However, the approach is criticized because key aspects of a scheduling problem can be overlooked, such as skills and other constraints.

Turning to the Examiner's characterizations of the Powell reference, it is not accurate to describe the Powell reference as teaching the assignment of a field service representative to each area and further teaching assigning at least one skill level to each area. With respect to "assigning a field service representative to each work area," the Powell reference merely describes assigning bands centered around a central depot to different time windows. The bands of time windows have been characterized by the Examiner as being the same as the "work areas" recited in claim 1. There is nothing in the Powell reference that suggests that service technicians should be or are assigned to each of the different bands shown in Figure 2. On the contrary, reading the problems which the solution of Figure 2 is meant to resolve, which are described in paragraphs 38-40, the Powell reference suggests that service technicians should be able to attend to customers located between a first customer located further out and the service technician's home location. *See* paragraph 39. Applying this to Figure 2, a service technician should be able to provide service to a customer located in a band further away from the central depot 22 and also provide service to another customer located in a band closer to the central depot 22. This situation necessarily requires a service technician to be able to provide service in more than one of the bands defined by the concentric circles and not be assigned to any particular band (i.e., work area).

As for assigning at least one skill level to each area, the assumption that all the service technicians are capable of the same skills does not equate to assigning at least one skill level to each area. In fact, this assumption teaches away from making any assignment of skill levels to each area, since it would be unnecessary to do so because there are no skill levels other than the one assumed for all of the service technicians. That is, having technicians of only one

skill level does not require assignment of skills to the work areas because one technician is as good as another. Assigning at least one skill level to each work area suggests that there are different skill levels, which is contrary to the assumption made for the solution of Figure 2.

As indicated by the Examiner, the Lesaint patent fails to explicitly disclose assigning a field service representative to each area where each field service representative has an associated skill level, and assigning at least one skill level to each area. As previously discussed, despite the Examiner's assertion to the contrary, the Powell reference also fails to teach or suggest the same limitations.

For the foregoing reasons, claim 1 is patentable over the Lesaint patent, in view of the Powell reference. Claims 6, 13, 24, 29, 36, and 47 recite limitations similar to the limitations previously discussed with respect to claim 1, and consequently, claims 6, 13, 24, 29, 36, and 47 are similarly patentable over the Lesaint patent, in view of the Powell reference. Claims 2-5, which depend on claim 1, claims 7-12, which depend from claim 6, claims 18-23, which depend from claim 13, claims 25-28, which depend from claim 24, claims 30-35, which depend from claim 29, claims 42-46, which depend from claim 41, and claims 48-50, which depend from claim 47, are similarly patentable based on their dependency from a respective allowable base claim. That is, each of the dependent claims further narrows the scope of the claim from which it depends, and as a result, if a claim is dependent from an allowable base claim, the dependent claim is also allowable. Therefore, the rejection of claims 1-13, 18-36, and 41-50 under 35 U.S.C. 103(a) should be withdrawn.

Claims 14-17 and 37-40 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Lesaint patent, in view of the Powell reference, and in further view of the Babayev patent.
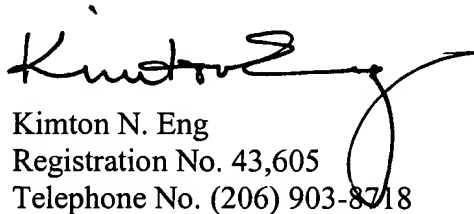
The Babayev patent has been cited by the Examiner for teaching (1) informing the customer service representative of the reason either validation failed; (2) providing the customer service representative with an indication that the reason for the failure was the result of insufficient projected service resources; and (3) providing the representative with the degree to which the requested appointment windows are overbooked. Even if it is assumed for the sake of argument that the Examiner's characterization of the Babayev patent is accurate, the Babayev patent fails to make up for the deficiencies of the Lesaint patent and the Powell reference, as

previously discussed. Consequently, the combined teachings of the Lesaint patent, the Powell reference, and the Babayev patent fail to teach or suggest the combination of limitations recited by the respective claim. Therefore, the rejection of claims 14-17 and 37-40 under 35 U.S.C. 103(a) should be withdrawn.

All of the claims pending in the present application are in condition for allowance. Favorable consideration and a timely Notice of Allowance are earnestly solicited.

Respectfully submitted,

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